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Range Utilization Patterns as Affected by Fencing and Class of Livestock¹

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How to obtain uniform use of the range by livestock is an important and difficult problem in the Southwest. Stoddard and Smith³ pointed out that "no western mountain range and few level ranges can be uniformly utilized." Utilization may reach 100 percent around water, but declines as distance from water increases.⁴

Many suggestions for obtaining uniform utilization have been advanced: cross fencing, salting away from water, fertilizing outlying areas, reseeding outlying areas to more preferred species, and using minerals or supplemental feeding in ungrazed areas. None of the past studies have indicated, however, how utilization patterns in fenced pastures may change when the pastures are grazed by

different classes of livestock. Also, there is little information on changes in grazing patterns caused by fencing.

The objective of this note is to give an example of how fencing small watersheds and stocking them with different classes of cattle affected the grazing patterns at one location in the Rio Grande Basin.

STUDY SITE

The San Luis experimental site, 58 miles northwest of Albuquerque, New Mexico, consists of three adjacent watersheds (529, 525, and 364 acres), with southerly drainage, in the transition zone between woodland and semi-desert grassland. Principal forage species are alkali sacaton (Sporobolus airoides Torr.) and galleta (Hilaria jamesii (Torr.) Benth.). Average annual precipitation is 13 inches.⁵

Three distinct topographic types exist on the watersheds--"uplands," "breaks," and "alluvium" (figs. 1 and 2). The high, rocky hills of the "uplands," or headwaters, terminate in rocky "breaks," from which steep

¹ Research reported here was conducted in cooperation with the Bureau of Land Management, U. S. Department of the Interior.

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³ Stoddard, Laurence A., and Smith, A. D. Range Management. 547 pp., McGraw-Hill Book Co., New York, New York. 1955.

⁴ Holscher, Clark E., and Woolfolk, E. J. Forage utilization by cattle on northern Great Plains ranges. U. S. Dept. Agr. Cir. 918, 27 pp. 1953.

⁵ U. S. Soil Conservation Service. Isohyetal Map, 1951.

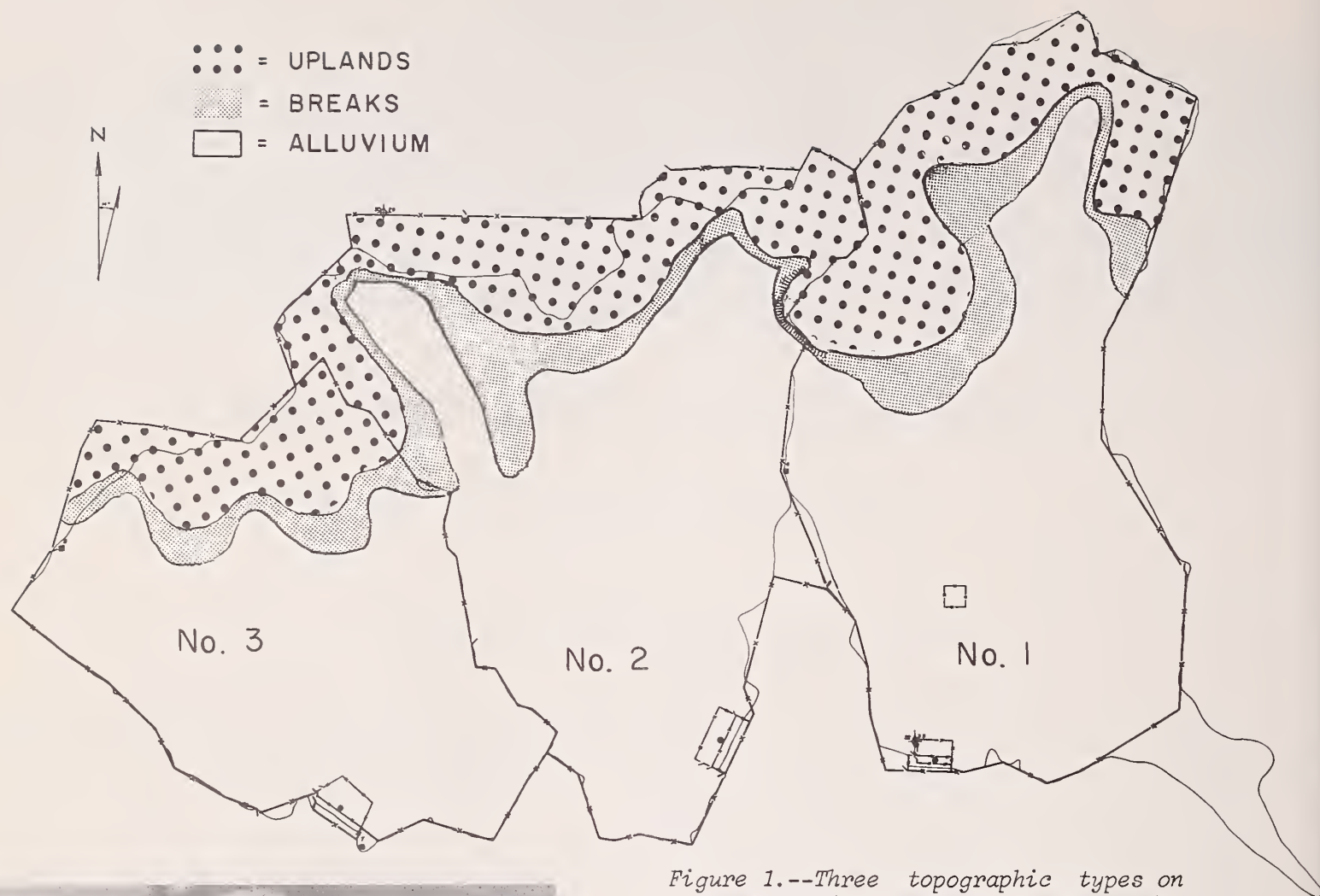


Figure 1.--Three topographic types on the San Luis Experimental watersheds.

Figure 2.--On the San Luis watersheds, the three distinct topographic types are:

Uplands

Breaks

Alluvium



Figure 3.--A stock watering tank is located at the southern end of each watershed.



hillsides extend down to the gently sloping "alluvial" grassland. A stock watering tank is located in this grassland at the southern end of each watershed (fig. 3).

METHODS

The three watersheds were grazed from October to May each year (winter grazing) by various classes of Hereford cattle (table 1).

Prior to 1954, the watersheds were grazed by mixed classes of cattle and horses. Although the area had been broken down into

individual grazing allotments, there were few fences, and grazing was more or less on a community-allotment basis. Grazing use was excessive but fairly uniform.

During the first two winters of study (1954-55 and 1955-56) the watersheds were unfenced and were grazed as part of the open range. The next year (1956-57) the lower half of the exterior boundary was fenced. Fencing was completed June 30, 1957, and thereafter animals were confined to individual watersheds during the winter grazing seasons. Fences were constructed along the hogbacks or dividing lines between the in-

Table 1. --Average utilization and average variation of utilization from the mean on the San Luis watersheds, New Mexico, 1954-62

Years	Classes of cattle grazed	Galleta		Alkali sacaton	
		Utiliza- tion	Varia- tion	Utiliza- tion	Varia- tion
- - - - <u>Percent</u> - - - -					
1954-55; 1955-56	Yearling steers	32	10.0	39	15.7
1956-57	Mixed herd (cows of all ages, calves, bulls, yearling steers, yearling heifers)	79	12.7	80	19.9
1957-58	Yearling heifers	24	6.3	31	7.6
1958-59	Old cows and calves	21	14.6	46	27.7
1959-60; 1960-61; 1961-62	Young cows and calves	26	17.1	62	33.4

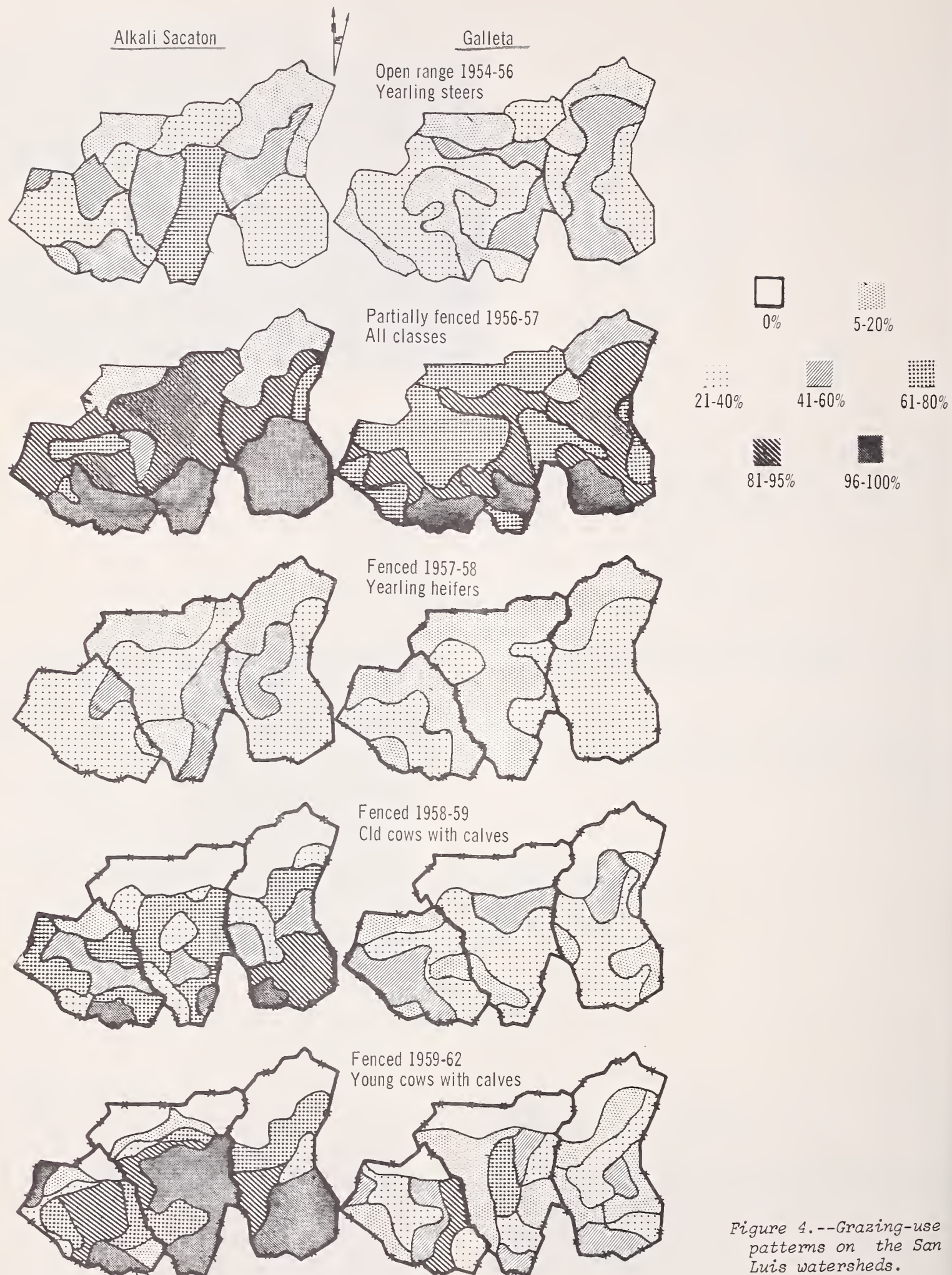


Figure 4.--Grazing-use patterns on the San Luis watersheds.

dividual watersheds. Consequently, cattle did not walk these fence lines and utilization patterns were not influenced by the presence of these fences.

Forage utilization was estimated on each of the three watersheds at the end of each grazing period. The ocular-estimate-by-plot method⁶ was used on 9.6-square-foot plots to determine utilization.

Located at random in each watershed were 24 clusters of 9 permanent plots each--a total of 648 plots for the study site.

Stocking rates on the three watersheds were adjusted annually on the basis of forage production estimates made each fall after the termination of growth. Forage production was determined by the double sampling technique.⁷ Estimates of weight, by species, were made on each permanent plot. These estimates were then adjusted by a regression developed from estimated and harvested weights of herbage on one temporary plot located near each of the 72 clusters of permanent plots. Grass plants on these 72 temporary plots were clipped to within three-quarters of an inch of the root crown.

Observations of cattle movement and behavior were recorded for a minimum of 1 day per week throughout each grazing season.

RESULTS

Since each class of livestock behaved and grazed differently on the three topographic types, the results are presented by the year or years in which each class was used.

1954-55, 1955-56.--The watersheds were grazed as part of the open range before they were fenced. Although other classes of cattle had access to the watersheds, use during

these 2 years was predominantly by yearling steers. During the period, grazing was fairly uniform (fig. 4, table 1). The uplands to the north were used only slightly less than the flat or gently sloping alluvium closer to water. The rocky breaks appeared to present a challenge to yearling steers. At any rate, they tended to graze outlying areas, walk to water, drink and rest, then walk back to distant localities before grazing again. Consequently, use around watering tanks was no heavier than it was in some of the more distant areas.

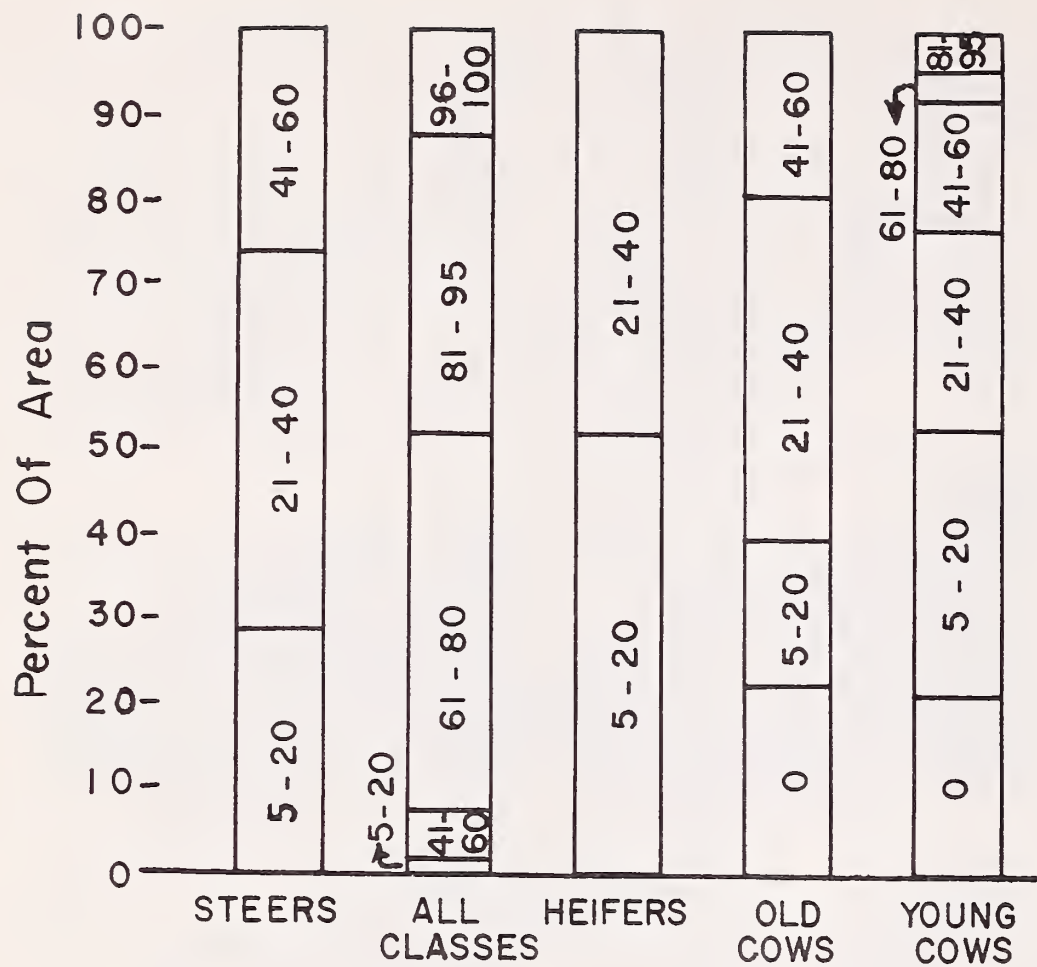
1956-57.--The east, west, and south boundary fences served as a funnel to the only water in the immediate area, which was located at the extreme southern end of each watershed. Lack of complete control prior to fencing resulted in nearly doubling the anticipated stocking of the three watersheds. Although utilization on all three watersheds was heavy, it was fairly uniform except on areas immediately surrounding the stock tanks. Here utilization of the principal forage species averaged 98 percent. Cows and calves tended to use the juniper areas or areas sheltered by the breaks (fig. 5). Cows also spent a great deal of time around water. Bulls spent most of their time around water and seldom moved as far north as the other classes of cattle, except when following a cow in heat. Yearlings continued to use the uplands.

Figure 5.--Sheltered areas, such as this, received extremely heavy use from cows and calves.

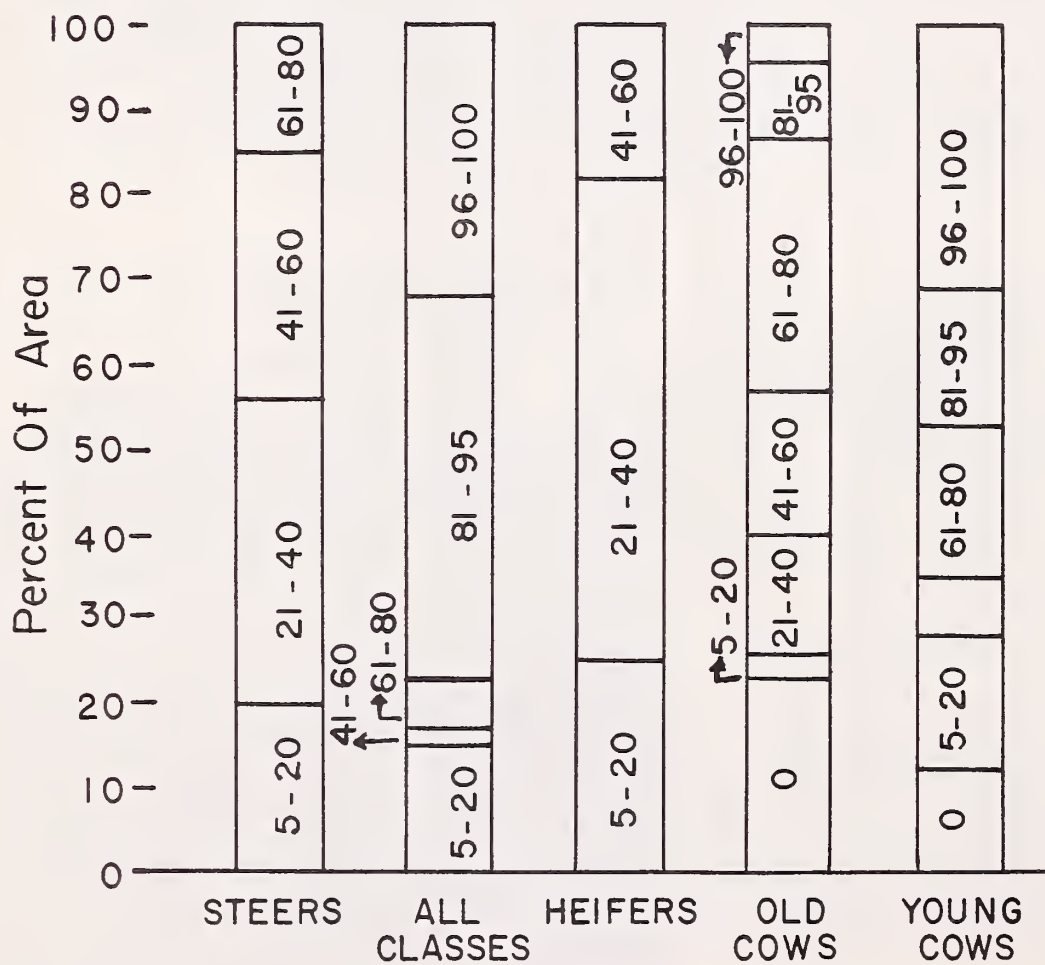


⁶ Pechanec, J. F., and Pickford, G. D. A comparison of some methods used in determining percentage utilization of range grasses. *Jour. Agr. Res.* 54: 753-765. 1937.

⁷ Wilm, H. G., Costello, David F., and Klipple, G. E. Estimating forage yield by the double sampling method. *Amer. Soc. Agron. Jour.* 36: 194-203. 1944.



GALLETA



ALKALI
SACATON

Figure 6.--
Variation in use of
galleta and alkali
sacaton by classes
of grazing stock.

1957-58.--This was the first season the watersheds were fenced so that cattle could be kept continuously on each watershed during the grazing season. The watersheds were stocked with yearling heifers. Utilization was more uniform than in previous years. Although use tended to be slightly heavier on the more accessible terrain, it was quite uniform over each watershed. The heifers readily negotiated the steep rocky breaks to graze the uplands. When not grazing they spent a great deal of time on the rock bluffs looking around. The alluvial bottomlands were grazed as the yearlings traveled from the uplands to water and back. Utilization near the reservoirs was less than during any other year of the study. The low average variation of use (table 1, fig. 6), revealed that yearling heifers were much more active than yearling steers and grazed an area more uniformly.

1958-59.--The three watersheds were stocked with weak old cows (7 years old or more) that calved in January, February, and March. During the first few days of the grazing season, the cows grazed over large portions of the watershed. They then used accessible areas that were protected from the weather by pinyon-juniper clumps or ridges, and completely ignored the uplands. Cows continued to graze these protected areas to the virtual exclusion of all other areas. Good, accessible, but unprotected grassland with flat or gently sloping terrain was ignored until, after approximately 16 weeks of grazing, the cows were forced out of the more sheltered areas due to lack of forage.

1959-60, 1960-61, 1961-62.--During these 3 years, the watersheds were stocked with young cows (coming 3 years old up to 7 years old) that calved in January, February, and March. These cows also grazed over large portions of the watersheds during the first few days. Instead of moving to the protected sites, however, they moved to the open alluvial grasslands. They used the sheltered areas only to calve and during periods of inclement

weather. As forage in the lower, alluvial grasslands declined, the young cows used the outer edges of the more difficult terrain, uplands, and breaks. When grazing in steeper terrain, the cows left their calves hidden in the sheltered areas or in the sagebrush flats surrounding the water. Utilization in the vicinity of water was heavier than at any other time except in 1956-57 when cows, as well as other classes of cattle, were present.

CONCLUSIONS

1. Utilization patterns on small watersheds grazed by yearling cattle were about the same before and after fencing.
2. Yearling cattle utilize grasses more uniformly over variable terrain than do either cows with calves or mixed classes of cattle.
3. Yearling heifers are more active than yearling steers on steep, rocky terrain.
4. Cows and calves tend to utilize alkali sacaton and galleta immediately surrounding water much more heavily than do yearlings.
5. Old cows with calves tend to utilize the sheltered areas predominantly, and enter open terrain only when forced out due to lack of forage.
6. Young cows with calves use the open grasslands more than old cows, and enter the edges of the more inaccessible terrain only when faced with a lack of forage.
7. On rough terrain more uniform utilization may be attained by grazing with yearling heifers. When grazed as open range, mixed classes give most uniform use.

